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TWELFTH ANNUAL REPORT OF THE DIRECTOR.

SUBMITTED TO THE TRUSTEES JANUARY 9, 1901.

To the Board of Trustees of the Missouri Botanical Garden:

The following report on the Missouri Botanical Garden and the Henry Shaw School of Botany is respectfully submitted in compliance with your rules.

THE BOTANICAL GARDEN.

In its essential features, the Garden has been maintained through the past year on about the same lines as for some years preceding, the principal differences in treatment being close to the main entrance, where, instead of the rather numerous small beds that have usually been devoted first to bulbs and later to cacti, etc., a heavy mass of Crotons was this year disposed on either side of the walk leading in from the main gate, these being replaced in autumn by bulbs for early spring flowering.

Though the revenue of the Board has not yet been increased through sales of real estate ultimately made possible by the Court decree noted in my last report,* the power to make such sales when necessary and desirable, now makes it possible to spend on the Garden the entire current revenue, as intended by its founder, and as a result the extensions which have been contemplated for some years past have now been begun, essentially on the lines indicated at length in my eighth report.†

The improvements made this year consist in the grading of some twenty acres of land lying on Alfred, Magnolia and Tower Grove avenues, and in planting the blocking-out border about this tract, on plans prepared some years

* Report. 11:13.

† Report. 8:37.

since by Messrs. Olmsted, Olmsted and Eliot. In the grading, which involved the moving of 48,878 cubic yards of earth, two rather large ponds, connected by a meandering brook, were made, and the ground was given an easy, somewhat undulating and varied fall from the streets to these bodies of water. Along the streets, the border, averaging about 55 feet in width, has been planted closely so as to secure immediate effect, but necessitating subsequent thinning, with a skilfully arranged mixture of 30 species of trees and 100 species of shrubs (to which 8 additional species of shrubs remain to be added). Well grown nursery stock of good size was selected, so that even in the first year it is believed that the masses of foliage will be striking and attractive, while they will increase in effectiveness and beauty each year as the trees grow.

All of the material used in this border plantation is representative of North American plants, and it is proposed as rapidly as the funds at the disposal of the Board permit, to provide suitable drainage and water supply for the recently graded tract, on which will then be planted, in accordance with the plans of the landscape architects above named, a collection of 181 arborecent, 269 fruticose, and some 1,400 herbaceous species, representative of the North American flora, and arranged essentially in the familiar sequence of families of the "Genera Plantarum" of *Bentham and Hooker*.* The woody plants needed for this synopsis, to the extent of 139 trees and 204 shrubs, are already in the nursery. Before the tract is opened to the general public, the unplanted areas will be converted into lawn, and the whole will be provided with suitably arranged paths,—a result that will probably be achieved within five years, by which time the trees and shrubs are expected to have reached a sufficient size to make this one of the most beautiful parts of the entire Garden.

* Report. 8:38.



AMONG THE ALOES.

Including the border of the newly graded addition, and the woody plants destined for the North American synopsis but yet in nursery, the Garden now contains 9,194 species and varieties of plants (including annuals which were cultivated in their season and are likely to be cultivated or replaced by others another spring), of which 5,547 are annuals or hardy perennials, and 3,647 are cultivated under glass. As compared with 1899, this shows a net increase of 67 species.* The plants added in 1900 consist of 344 entries, of which 69, including 11,545 plants or packets of seeds and valued at \$808.85, were collected or propagated by Garden employees; 178, consisting of 4,001 plants or seed-packets and valued at \$635.95, were presented, mainly in exchange for similar material or, chiefly, for the publications of the Garden; and 94, including 26,829 plants or packets of seeds, were bought, the expenditure for plants and seeds through the year, as shown by the Secretary's books, amounting to \$3,254.39 (of which sum \$2,236.55 was for the planting of the border). By way of exchange, 239 packets of seeds and 267 plants, appraised at \$46.85, were distributed to correspondents of the Garden; and 2,416 surplus plants and a few packets of seeds were presented to schools and charities, in continuation of the policy inaugurated some years since.†

A further extension of the plant houses begun in 1894‡ and enlarged in 1897, has now been made by the erection of a tower at the northwestern corner of the system, similar to that built at the northeastern angle in 1897, and connected with the houses already standing and extended southwardly by wings of similar design to those previously built, but of steel construction. In these additions, small but representative collections of succulents and of Acacias and

* Report. 11:13.

† Report. 10:15. 11:13.

‡ Report. 6:14. 8:41. 9:14. 10:13.

Acacia-like plants have been planted out in a natural manner, and it is expected that far better specimen plants representing these groups will thus be grown than has been possible while they were cultivated in pots and tubs. The quadrangle inclosed by this range of houses and the old main greenhouse with its Agave wing, now devoted to temporary potting and other work sheds, frames, and propagating houses, will, it is hoped, be renovated in the course of the next year or two, the old flue-heated propagating houses being then removed and replaced by a system of houses of modern plan and construction, heated by hot water from the boilers which now heat the new range and the *Victoria* pond.

The records of the Gate-keeper show that in 1900, 42,483 persons visited the Garden on week-days, 6,911 on the open Sunday in June, and 14,488 on the open Sunday in September,—making a total of 63,882 for the year. Though considerably smaller than the number for the previous year (71,021), this total is unexpectedly large when it is recalled that for eight weeks following May 8th, in the most attractive season of the year, the entire city was almost paralyzed by a car strike which, though it did not stop the car service, effectually prevented the use of the cars on many lines except when such use was imperatively necessary, while, for the two months following, a nominal continuation of the strike greatly interfered with the use of the cars.

The practice of securing the more important current collections for the herbarium has been continued through the year just ended, and a number of special collections of considerable size have been purchased or secured by exchange. The material incorporated in the herbarium during the year comprises 8,415 sheets of specimens, of which 3,649 were bought, 11 pertain to the Redfield collection, 3,002, appraised at \$150.10, were presented or obtained in exchange for duplicates or for the publications

of the Garden, and 1,753 were collected by employees of the institution. The Secretary's books show an expenditure of \$762.61 for herbarium supplies and purchases. By way of exchange, 115 herbarium specimens, valued at \$5.75, were distributed to correspondents, and 33 fragments, without nominal value, were sent to specialists for research purposes.

The present composition of the herbarium is as follows: —

Engelmann Herbarium (all groups) about 97,800 specimens.

The General Herbarium: —

Higher plants.

The J. J. Bernhardi Herbarium	61,121	
The J. H. Redfield Herbarium	16,447	
Other specimens	150,456	
	228,024	"

Thallophytes.

The J. J. Bernhardi Herbarium *	126	
Other specimens	22,815	
	22,941	"

Making a total of about 348,765 " Valued at \$52,814 75†

The following, practically a part of the herbarium facilities, are the same as last year: † —

Wood specimens of various sizes	1,027	valued at \$100 00
Wood veneers, by Spurr, Hough, Nördlinger, and Michel	2,279	" " 160 00
Microscope slides, by Hough, Penhallow, Munroe, and others	1,051	" " 250 00
Together	4,357	" " \$510 00

* So far as yet incorporated.

† The valuation of such collections is purely arbitrary, since they could not be exactly replaced for any amount of money, in case of loss; but they are appraised at \$15.00 per hundred mounted sheets. — Report.

The additions to the library in 1900 include 573 books and 31 pamphlets purchased, and 311 books and 456 pamphlets, valued at \$577.97, presented or sent in exchange for Garden publications. The Secretary's books show that during the year \$4,009.54 was spent for additions to the library and for binding and pamphlet covers.

The card index has been enlarged by the incorporation of 5,368 new cards, of which 2,068 were bought, and 3,300 were written by employees of the institution.

As now constituted the library contains:—

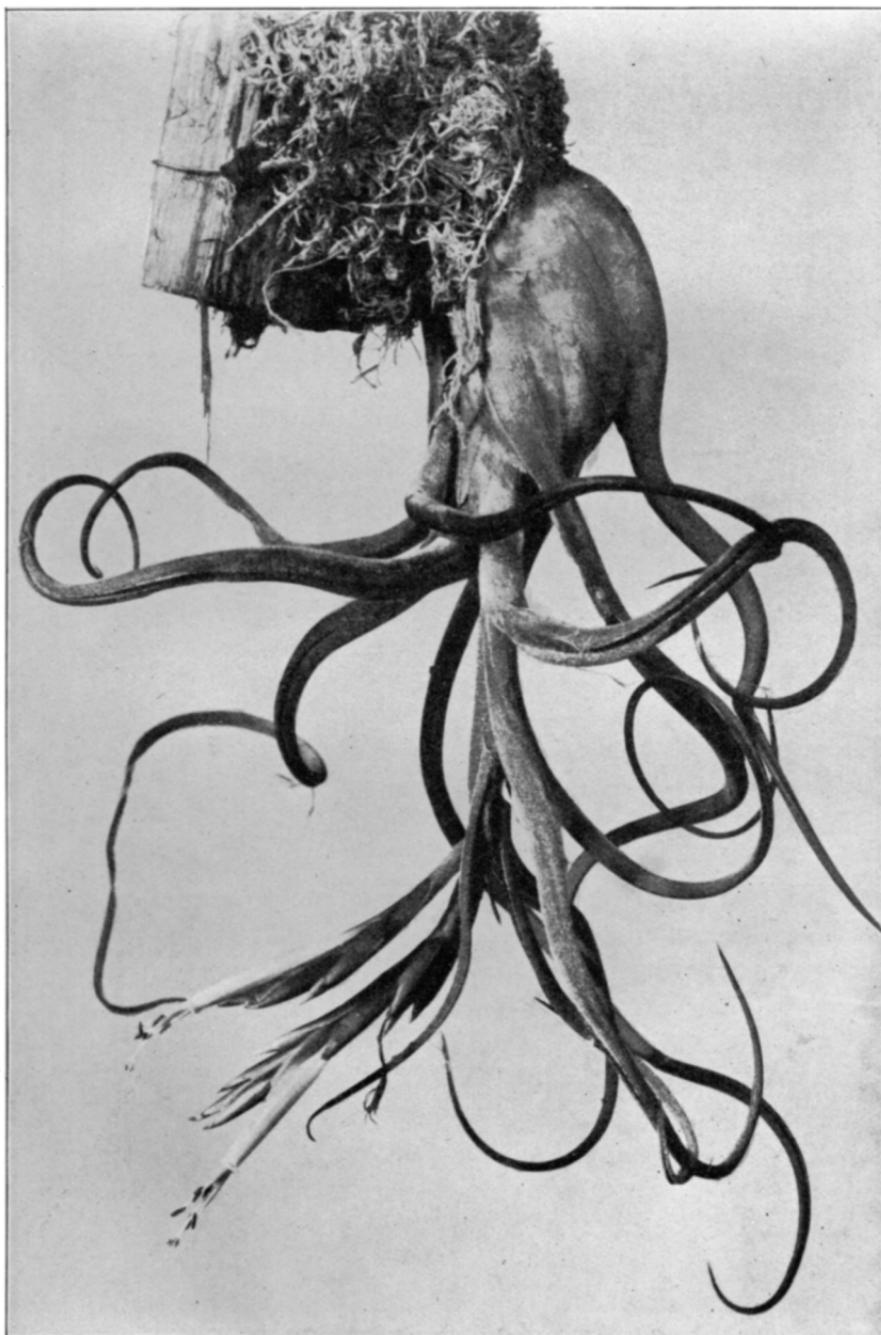
Pamphlets	19,662					
Books (general)	14,642					
	<hr/>					
	34,304	valued at			\$53,618	18
Books (Sturtevant Prelinnean Library)*	463	" "			2,315	00
Manuscript volumes (Shaw, En- gelmann and Roetter) . . .	66	" "			800	00
	<hr/>					
Total	34,833	" "			\$56,733	18
Index cards.						
Various	206,815					
Sturtevant Index . . .	52,300					
	<hr/>					
Total	259,115	" "			2,591	15
Total valuation					\$59,324	33

The manuscript catalogue of the library, to which reference has been made in previous reports,† has been increased by "copy" cards for the books and pamphlets incorporated during the year, but its publication is not yet considered expedient.

Of the small handbook on sale at the gate, 163 copies were sold in 1900, and 3 copies were given away.

* The original number and arbitrary valuation of the collection presented by Dr. Sturtevant. (Report 8: 21). On the Prelinnean shelves are now found a larger number of volumes than is indicated here, the accession and valuation of these, however, from year to year being included in the general accession lists and the valuation of the library as a whole.

† Report. 9:16. 10:21. 11:17.



TILLANDSIA BULBOSA PICTA.

The library exchange list has been considerably increased, so that at present 1,093 serial publications are received, of which 84 are purchased, and 1009, issued by 770 institutions, are presented.*

Visiting botanists, as in previous years, have made use of the facilities for investigation afforded by the Garden, which have also been made available to correspondents as far as practicable, and one candidate for the Master's degree in Washington University has spent a part of the year in resident graduate work.

The office staff has remained the same as in 1899, except that Mr. Jesse B. Norton resigned his position in the library in February, his place being taken by Miss Ida L. Norton. Approximately the same percentage of their time as in preceding years has been given by the Horticultural and Botanical Assistants to research work, some of the results of which are now ready for publication and will shortly appear in the Reports of the Garden or other suitable places. In the course of a hasty visit to Northern Mexico in March, I became sufficiently interested in several undescribed or imperfectly known Yuccas and Agaves and related plants to revisit Mexico twice later in the season, and the results of my study of these plants, which were presented in abstract before the Botanical Society of America in June, will be published from the Garden in the near future.

The instruction of Garden pupils, provided for in Mr. Shaw's will, has been carried on during the year on the lines noted in earlier reports. Two pupils, Charles Deusner and Cornelius Winther, having completed the prescribed course, were granted certificates in March, after examination by the Garden Committee. The vacancies so created were filled by the appointment of Charles W. Fullgraf, of St. Louis, and Oliver P. Marker, of Evansville, Ind.; and John H. Tull, of Morganton, N. C., was admitted in April

* Report. 10:25, 91. 11:17.

as a paying pupil, under the provisions made by the Board some years since.

Four annual events provided for in the will of the founder of the Garden, have taken place, as follows: The preaching of a sermon on the wisdom and goodness of God, as shown in the growth of flowers, fruits and other products of the vegetable kingdom; the eleventh banquet to the Trustees of the Garden and their invited guests; the eleventh banquet to the gardeners of the institution, and invited florists, nurserymen and market gardeners, and the award of premiums and prizes at a flower show held in St. Louis.

The flower sermon was preached in Christ Church Cathedral, St. Louis, on the morning of May 13, by Rt. Reverend Alexander C. Garrett, D.D., of Dallas, Texas.

The Trustees' banquet was given at the Southern Hotel, on the evening of March 31st. Covers were laid for 145 persons, among whom, in addition to the Trustees of the Garden, representative citizens of St. Louis and several distinguished investigators in botany and related sciences, were the officers and members of the North Central Association of Colleges and Secondary Schools, then meeting in the city.

Mr. Henry Hitchcock, Vice-President of the Board, presided, and speeches or addresses, suitable to the occasion, were made by Dr. L. O. Howard, Entomologist of the United States Department of Agriculture, President William F. Slocum, of Colorado College, President Charles F. Thwing, of Western Reserve University, Professor L. H. Bailey, of Cornell University, Professor J. B. Johnson, of the University of Wisconsin, and Rev. Dr. I. S. Hopkins, of St. Louis.

The banquet to gardeners, nurserymen and florists was given at the Mercantile Club on the evening of November 3d. Covers were laid for 110 persons, among whom were the gardeners and office staff of the Garden, repre-



A GROUP OF IRIS.

sentative florists, nurserymen and market gardeners of the vicinity, and officers and representatives of several state and national horticultural organizations.

The Director of the Garden presided, in accordance with the directions of Mr. Shaw's will. Speeches appropriate to the occasion were made by President-elect Patrick O'Mara, of the Society of American Florists, Mr. Jared G. Smith, in charge of the work of plant and seed introduction of the United States Department of Agriculture, Mr. J. J. Beneke, in charge of the Chrysanthemum Exhibition of the St. Louis Florists' Club, William Scott, in charge of floriculture at the Buffalo Pan-American Exposition, Mr. A. T. Nelson, of the Missouri Horticultural Society, and Hon. D. R. Francis and Mr. Julius C. Birge, of St. Louis.

As in previous years, the award of premiums for flowers and plants was intrusted to the St. Louis Florists' Club, on the occasion of its Chrysanthemum Exhibition, held in the Exposition Building, November 14th to 16th, inclusive.

THE SCHOOL OF BOTANY.

The undergraduate work of the Henry Shaw School of Botany followed essentially the lines in 1900 that have been detailed in earlier reports.* Seventeen electives in botany are offered, covering the subject in a symmetrical way, as to its essentials, and constituting the equivalent of about three full years' work, preparatory to the performance of thesis work in some special subject. The electives offered in the last University Catalogue are as follows:—

1. Elementary Morphology and Organography, with reference to Ecology and Systematic Botany. Lectures and demonstrations.
2. Elementary Anatomy and Phanerogamic Botany. Laboratory work.
3. Synoptical study of the Cryptogams. Laboratory work.
4. A special laboratory study of some group of Cryptogams.
5. Methods of Vegetable Histology. Laboratory work.
6. Histology and Morphology of the Higher Plants. Laboratory work.

* Report. 10: 38.

7. A laboratory study of the minute anatomy of the lower Cryptogams.
8. Technical Microscopy of Timbers. Laboratory work. *Two hours a week.*
9. Economic Botany. Lectures and laboratory demonstrations.
- 10-11. Applied Mycology. Laboratory work.
- 12-13. Garden Botany. Laboratory study of cultivated plants, at the Botanical Garden.
- 14-15. Vegetable Physiology. Laboratory work.
- 16-17. Bacteriological Technique. Laboratory work.

Graduate work, for students grounded in the elements of botany, is provided either at the University laboratories, where the principal instrumental equipment is kept, or at the Garden, according to the nature of the subject elected. During a part of the year just closed, one candidate for the Master's degree has been pursuing a course of this kind.

The instructional force of the School of Botany remains as at the beginning of the year.

Very respectfully,

WILLIAM TRELEASE,

Director.